

In re Appln of Takashi TANIOKA et al  
Appln. No.10/585,878  
Reply to Office Action of April 8, 2010  
Reply dated July 8, 2010

#### REMARKS

The Official Action of April 8, 2010, and the prior art relied upon therein have been carefully reviewed. The claims in the application are now claims 1-30, including new claim 30 and withdrawn claims 25-28 (which Applicants request be rejoined). These claims define patentable subject matter warranting their allowance. Favorable reconsideration and allowance are earnestly solicited.

Acknowledgement by the PTO of the receipt of Applicants' papers filed under §119 is noted.

New claim 30 is a combination of claims 16 and 5, and is patentable **at least** for the same reasons as claim 16, as explained below.

Among the amendments made above is an amendment of the term "ionizing" in the claims to "generating a plasma state," support being found in Applicants' specification in paragraph [0077]. Thus, Applicants' specification discloses that a fluoro compound-containing gas is used for generation of a plasma state.

Claims 1-24 and 29 have been rejected under the second paragraph of 35 USC §112. The rejection is respectfully traversed.

The PTO holds that "normal" pressure and "overpressure" are indefinite. Applicants respectfully disagree. "Normal pressure" is the same as atmospheric pressure, i.e. they are synonymous. Similarly, "overpressure" simply means a pressure greater than atmospheric pressure.

Nevertheless, in deference to the Examiner's views and to avoid needless argument, "normal pressure" and "overpressure" have

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been amended in the claims to respectively "atmospheric pressure" and "a pressure that is over atmospheric pressure," support being found for example in paragraph [0083] of Applicants' specification.

The rejection also states that the recitation of "the transportation system" in claim 3 and "the gas" in claims 3-7 has insufficient antecedent basis. While Applicants believe that those skilled in the art would fully understand the claims, nevertheless some amendments have been made to better conform with U.S. practice and in deference to the Examiner's views.

Thus claims 2, 3-7 and 17 are amended to obviate the rejections based on lack of antecedent basis.

Paragraph [0081] of the specification discloses that the excited fluoro compound containing gas is transported from the first chamber to the second chamber via a gas channel. The transportation system is an element or a component between the first chamber and the second chamber, such as a gas channel.

As regards antecedent basis for "the gas", there is only one previously recited gas, and so "the gas" must refer to the previously recited gas. In deference to the Examiner's views, the claims have been amended to change "the gas" to "the excited fluoro compound-containing gas." In claim 17, "the gas" has been amended to "an F<sub>2</sub>-containing gas" for more precise antecedent basis from claim 16.

Withdrawal of the rejection is in order and is respectfully requested.

Claims 1-16 and 29 have been rejected as obvious under 35 USC §103 from Siegele et al U.S. Application Publication 2004/0151656 (Siegele) in view of Warren et al USP 4,213,102 (Warren). This rejection is respectfully traversed.

Before evaluating the prior art relative to the present invention, it is important to understand that an initial operation or step in the present invention involves exciting at least one fluoro compound in a fluoro compound-containing gas by conferring energy on the fluoro compound-containing gas **under reduced pressure**. Such a step or operation is not present in either reference and therefore cannot be made obvious by a combination of those two references, even if such combination were obvious (respectfully denied for reasons set forth below).

Siegele discloses a system for generating  $F_2$  from HF. In this system, HF is electrolyzed in a plurality of electrolytic cells to generate a  $F_2$  and HF gas mixture, and  $F_2$  gas is separated from the mixture and stored in a tank.

The Siegele disclosure is somewhat cryptic in describing exactly what is carried out in the electrolytic cell-rectifiers. In general, however, "electrolysis" is carried out by inserting positive and negative electrodes into a liquid containing a substance to be electrolyzed. By such electrolysis, a product gas is generated from the liquid. In this event, "electrolysis" can be referred to as a method of producing a gas from a liquid. In general, this type of method is carried out under atmospheric pressure. Those skilled in the art can recognize that the electrolysis method disclosed in Siegele is carried out by applying electric energy to "a liquid state of HF" to produce "a gas state of  $F_2$ ." In other words, the feed material in Siegele is understood to be a liquid and the "electrolysis" is carried out at atmospheric pressure as is usual.

To the contrary, and as noted above, the starting material in the present invention is gaseous, namely "a fluoro compound-containing gas..." In the present invention, the gas is energized,

and this is carried out under reduced pressure, an operation very different from anything disclosed or taught by Siegele.

The PTO recognizes certain deficiencies in Siegele, and thus relies on Warren to make up for such deficiencies in Siegele. The rejection states that Warren teaches converting an excited fluoro compound-containing gas to fluorine, and it therefore would have been obvious to somehow modify Siegele in view of Warren to provide the claimed subject matter "because the substitution of one known element for another would have yielded predictable results..." Applicants greatly disagree that anything incorporated from Warren into Siegele would provide Applicants' invention.

Unlike Siegele and also unlike the present invention, Warren discloses a system for generating fluorine for use as a gaseous reactant in a chemical laser from a storable gas supply of  $\text{NF}_3$ . As shown in figure 2 of Warren, the raw material  $\text{NF}_3$  is thermally decomposed into the mixture of F,  $\text{F}_2$  and  $\text{N}_2$  by combustion of hydrocarbon  $\text{C}_2\text{D}_2$  ( $\text{C}_2\text{H}_2$ ). In this mixture, F will change into  $\text{F}_2$  when the mixture is cooled.

When a substance is thermally decomposed, the ambient gas will expand. This step is quite different from the step of exciting at least one fluoro compound in a fluoro compound-containing gas by conferring energy on the fluoro compound-containing gas under reduced pressure, recited in the claims of the subject application.

As noted above, the object in Warren is to generate fluorine for use as a gaseous reactant in a chemical laser from a storable gas supply of  $\text{NF}_3$  (see the Warren abstract). While the first paragraph of column 3 of Warren discloses "vibrationally excited HF," this excited HF is not generated from the storable gas supply of  $\text{NF}_3$ , but instead is prepared from  $\text{F}_2$  produced in the Warren system and  $\text{H}_2$  introduced from outside the Warren system; and the so produced HF is

used for a laser emission. Applicants see no relation between Warren and either Siegele or the present invention.

As to the proposed combination, Applicants do not see how the references can be combined, let alone how a person of ordinary skill in the art could possibly combine the references in any meaningful way. The objectives in Warren and Siegele are so different that the person of ordinary skill in the art would have had **no reason** to even attempt to combine the references, and in particular to modify Siegele by anything disclosed in Warren.

In more detail, and while electrolysis of HF disclosed in Siegele, and thermal decomposition of  $\text{NF}_3$  disclosed in Warren, both involve applications of energy, the processes of electrolysis and thermal decomposition are so unrelated and so different that the person of ordinary skill in the art would have had no reason to even consider any combination of such distinct processes.

Moreover, even if the references could somehow be combined as proposed, contrary to Applicants' position as explained above, such a reconstructed Siegele (modified by Warren), if possible, would not reach (correspond to) Applicants' claimed invention because in both prior art references energy is applied under atmospheric pressure. These citations do not disclose or suggest exciting at least one fluoro compound in a fluoro compound-containing gas by conferring energy on the fluoro compound-containing gas under reduced pressure, recited in the claims of the subject application.

Accordingly, claim 1 defines non-obvious subject matter over any possible combination of Siegele in view of Warren, even if such a combination were obvious.

Because claims 2-16 and 29 call for the same features as set forth in claim 1, it also follows that claims 2-16 and 29 also define non-obvious subject matter for the same reasons as discussed

above with respect to claim 1.

Withdrawal of the rejection is in order and is respectfully requested.

Applicants respectfully add with respect to claim 16 that the Examiner's reliance on paragraph [0063] of Siegele is misplaced. Thus, paragraph [0063] of Siegele relates to cleaning of the deposition chambers, and this of course is vastly different from modifying a surface of an article, e.g. surface modification involves changing the chemical or physical characteristics of the surface treated (e.g. fluorinating the surface, as called for in claim 18), whereas cleaning in Siegele only involves removing surface deposits.<sup>1</sup>

Claims 17-24 have been rejected as obvious under 35 USC §103 from Siegele in view of Warren, and further in view of Laxman et al USP 5,492,736 (Laxman). This rejection is respectfully traversed.

Claims 17-24 depend directly or indirectly from claim 16, and therefore incorporate the subject matter of claim 16. Claims 17-24 are patentable for the same reasons as claim 16, as pointed out above, bearing in mind that Laxman has not been cited to make up for the aforementioned deficiencies in the proposed combination of Siegele in view of Warren, and indeed does not make up for such deficiencies.

Moreover, Laxman discloses a process for forming a fluorine-containing silicon oxide film on a substrate by plasma enhanced chemical vapor deposition using a specific fluorinated silicon source. Contrary to what is stated in the rejection, Laxman does not disclose any surface modification using F<sub>2</sub> gas.

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<sup>1</sup> Inherency also does not exist, as inherency must be reasonably certain.

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Applicants respectfully note that the method of claims 17 to 24 comprises a step of contacting F<sub>2</sub> containing gas to modify a surface of an article, which is recited in claim 16. Accordingly, the present invention of claims 17 to 24 is not obvious from a combination of Siegele, Warren and Laxman.

Withdrawal of the rejection is in order and is respectfully requested.

The prior art documents of record and not relied upon by the PTO have been noted, along with the implication that such documents are deemed by the PTO to be insufficiently material to warrant their application against any of Applicants' claims.

Applicants believe that all issues raised in the Office Action have been addressed above in a manner that should lead to patentability of the present application. Favorable reconsideration and formal allowance are respectfully requested.

If the Examiner has any questions or suggestions, she is respectfully invited and requested to contact the undersigned at (202) 628-5197.

Respectfully submitted,

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